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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MATZEK, MATTHEW D

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,835	Applicant(s) YOKOH ET AL.	
	Examiner MATTHEW D. MATZEK	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/06, 12/05</u> . | 6) <input type="checkbox"/> Other: _____ |

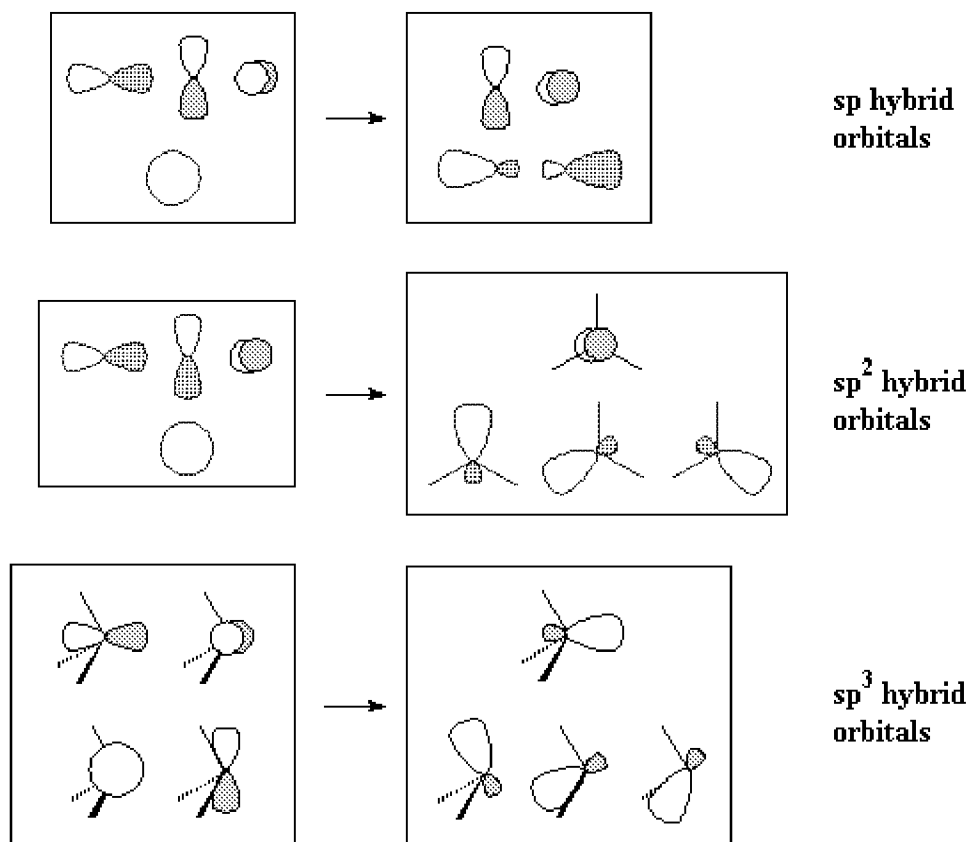
Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It appears that the purpose of the carbonaceous material is to provide a conduit for electrons between the first and second linear bodies, but carbon having a diamond structure has a SP^3 orbital configuration that does not provide for electron transmission resulting in an insulative phase. The carbon nanotubes and fullerenes have a SP^2 orbital configuration that does provide for free electrons to be transmitted, which makes these forms of carbon highly conductive. How can the diamond form of carbon perform in the desired conductive manner?

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The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 2-8 recite the limitation "electron-emitting woven" as set forth in claim 1. There is insufficient antecedent basis for the term "woven" in claim 1 to present it in the dependent claims. Regarding claim 3, it appears that "a carbon nanotube" should be plural. Furthermore,

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the term “like” renders the term "diamond-like carbon" indefinite". Something either is a diamond or is it not. The examiner suggests something on the lines of "carbon having a diamond structure". It is very clear that applicant intends to claim carbon having a tetrahedral structure.

5. Claim 5 recites the limitation "the fullerenes" are added to the conductive polymer. There is insufficient antecedent basis for this limitation in the claim. Since "fullerenes" were not previously presented, the examiner suggests that applicants delete "the".

Claim Objections

6. Claim 7 is objected to because of the following informalities: Applicant is directed to add the word “that” following the word “below” to clarify the intent of the diameter limitation. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Barrera et al. (WO 01/92381 A1). For easy referencing Examiner has relied upon the US PG Publication version (2006/0047052) of the WO document.

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- a. Barrera et al. disclose a method of forming nanocomposite fibers comprising nanotubes embedded within a polymeric matrix (abstract). The nanotubes may be carbon nanotubes [0012]. The fibers may in turn be woven together [0011]. The nanocomposite fibers of Barrera et al. may be used to make electronics and electrical wires [0067]. The nanocomposite fibers may be diameters up to 150 micron [0160].
- b. For examination purposes, Examiner has equated the highly conductive carbon nanotubes to represent the claimed conductive layer of the first linear bodies and the conductive material of the second linear bodies. The polymer that surrounds the embedded nanotubes in the first linear bodies represents the claimed insulating layer. Barrera et al. disclose that the nanocomposite fibers may be woven, which provides for the claimed spatial relationship of claim 1.
- c. Although Barrera et al. do not explicitly teach the claimed feature of electron emission, it is reasonable to presume that said property is inherent to Barrera et al. Support for said presumption is found in the use of like materials (i.e. aligned carbon nanotubes that are known to be electron emitting). The burden is upon Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barrera et al. (WO 01/92381 A1).

a. Barrera et al. fail to teach the use of different sized fibers in creating the woven article, however it would have been obvious to one of ordinary skill in the art to have used fibers of different diameters including second linear bodies with diameters of at most half of those of the first linear bodies motivated by the desire to have an article with biased structural properties including modulus, tear strength, etc.

b. Claims 2 and 3 are rejected as the polymer of the fibers may be removed revealing continuous fibers of nanotubes (abstract). One of ordinary skill in the art at the time of the invention would have found it obvious to have removed, dissolved, etc. the polymer of the second linear bodies motivated by controlling the physical properties of the overall woven article, such as electrical and thermal conductivities as well as mechanical properties. This woven fabric would have second linear bodies consisting of carbon nanotubes and said nanotubes would be present on a surface of cross parts of the second linear bodies crossing the first linear bodies at lifted portions and/or sunk portions of the first linear bodies because second linear bodies consisting of nanotubes would be touching the first linear bodies at the bodies points of intersection.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barrera et al. (WO 01/92381 A1) as applied to claim 1 above, and further in view of Smalley et al. (US 2003/0133865 A1) and Kochanski et al. (US 5,838,118). Barrera et al. fail to teach the use of the

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applied article along with a light-emitting portion provided to face the electron emission of the article in a display device.

a. Smalley et al. disclose the use of aligned nanotubes (abstract) for use in a variety of electrical capacities including field emission cathodes [0048] due to their conductive properties.

b. Barrera et al. and Smalley et al. are from the same field of endeavor (i.e. aligned carbon nanotubes).

c. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have used the aligned nanotube composites of Barrera et al. as field emission cathodes with the motivation of reducing the thickness of the overall display by shrinking the size of the cathode.

d. Kochanski et al. disclose a display apparatus comprising an electron emitting article and a light emitting article that faces the electron emitting piece and illuminates when struck with electrons (col. 1, lines 60-68).

e. Barrera et al. and Kochanski et al. are from the same field of endeavor (i.e. electrical devices).

f. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have added the display and its light emitting portion to the article of Barrera et al. with the motivation of forming a display.

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Allowable Subject Matter

Claims 4 and 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims and also be written in independent form.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach or provide motivation to have the conductive layer comprise conductive polymer, while still being covered by an insulating layer.

Information Disclosure Statement

The references listed on the International Search Report have been considered, but fail to anticipate or render obvious the claimed invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D. MATZEK whose telephone number is (571)272-2423. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571.272.1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew D Matzek/
Examiner, Art Unit 1794

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit
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